INTEX-A flight 4- July 6, 2004

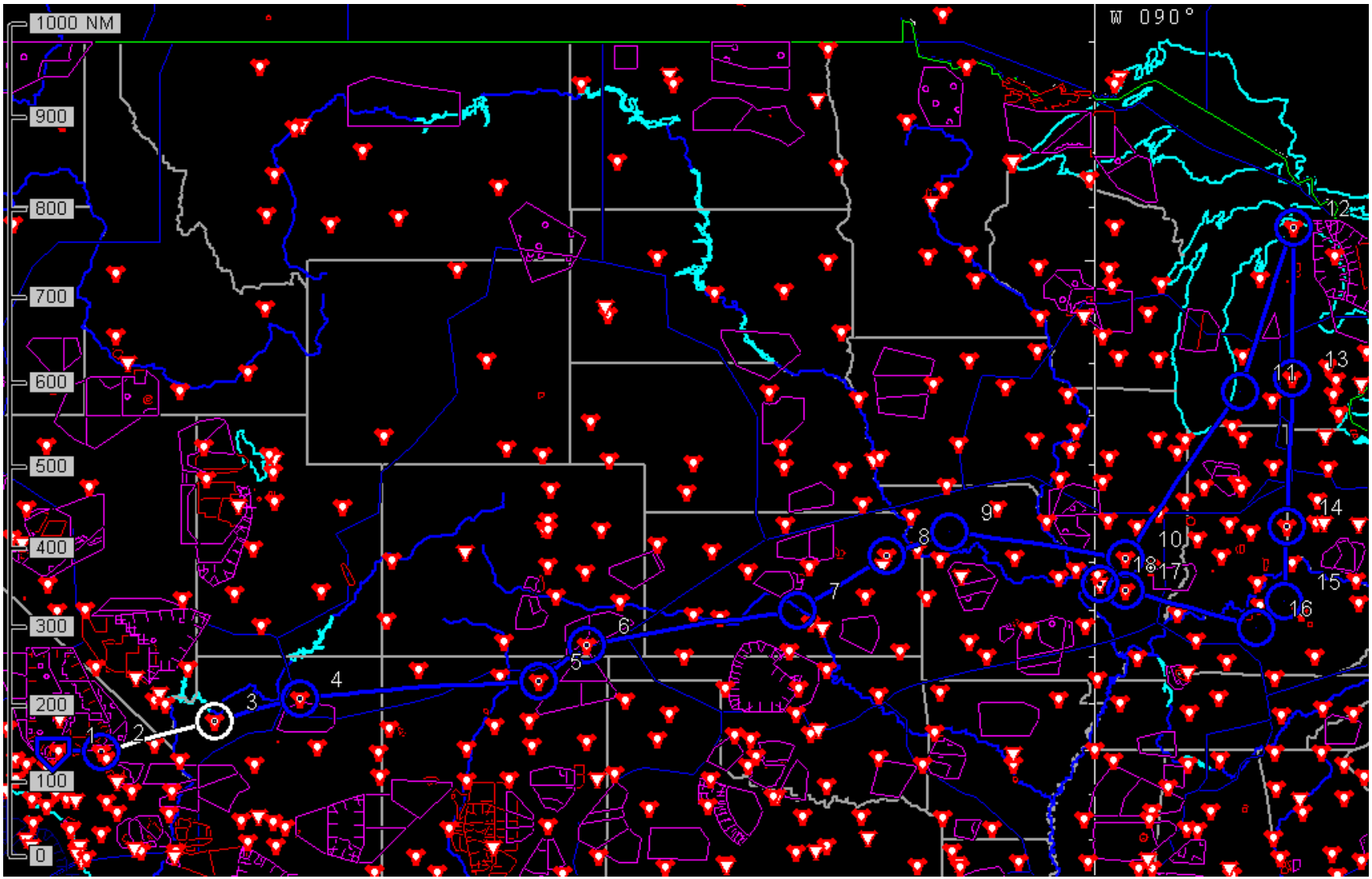
This was principally a transit flight from DFRC to MidAmerica that also incorporated several science objectives. Salient among the latter were characterization of low-level California pollution and fires over Arizona, high level Asian outflow, deep convection over central US, frontal passages and low level eastern pollution. Satellite validation for Terra was considered but could not be accommodated in this transit flight. The flight was guided by meteorological analysis and forecasts from multiple models. Total flight duration was 7.5 hours with a nominal 9:00 am takeoff. Basic flight patterns and there location are shown in the slides below although these were greatly modified during the flight principally due to bad weather and ATC requirements.

The surface flow was dominated by low pressure centered over Wisconsin. A cold front extended south of the low and was located along the Mississippi River during mid afternoon. A warm front stretched across northern Michigan, east of the surface low. A thermal low was centered over the Southwest. Intense convection was a highlight of the flight. Missouri experienced convection during the morning, and this area advanced southeast during the afternoon. During the later portions of the flight, the area of greatest storms was over southern Illinois and most of Kentucky. The DC-8 altered its flight track to avoid these storms. The flow in the upper levels was dominated by a vigorous short wave trough oriented through central Missouri and a ridge over the Intermountain West.

We flew east from California and sampled boundary layer pollution over the Central valley followed by elevated pollution levels below 15,000 ft that seemed to have their origin in fires over Arizona and Colorado. These pollution layers contained minimal ozone but large amounts of aerosol (soot, SO4, NO3, K), tracers (CO>280 ppb), and secondary organics. At around 100 W we ascended to the upper troposphere and intercepted both weak pollution features that may have originated in Asia but also stratified plumes of relatively recent origin. Deep convection was widespread over the central US and pollution plumes sampled from 4-10 km. We crossed cold fronts during our easterly transect before St. Luis and the subsequent northerly transect and spiraled down at about 46N observing significant drawdown of CO2. A low pressure regime resulted in extensive cloudiness requiring adjustment in DC-8 course. Returning to MidAmerica we sampled boundary layer pollution east of St. Louis that contained significant concentrations of aerosols (largely SO4), formaldehyde (>3 ppb), HNO3 and tracers but relatively low ozone levels (<65 ppb). All instruments (except GT-LIF) operated normally. Overall, this was a successful transit flight that was also able to accomplish limited science objectives

The navigational data are available at URL: http://www.dfrc.nasa.gov/Research/AirSci/DC-8/ICATS/index.html

INTEX JULY 6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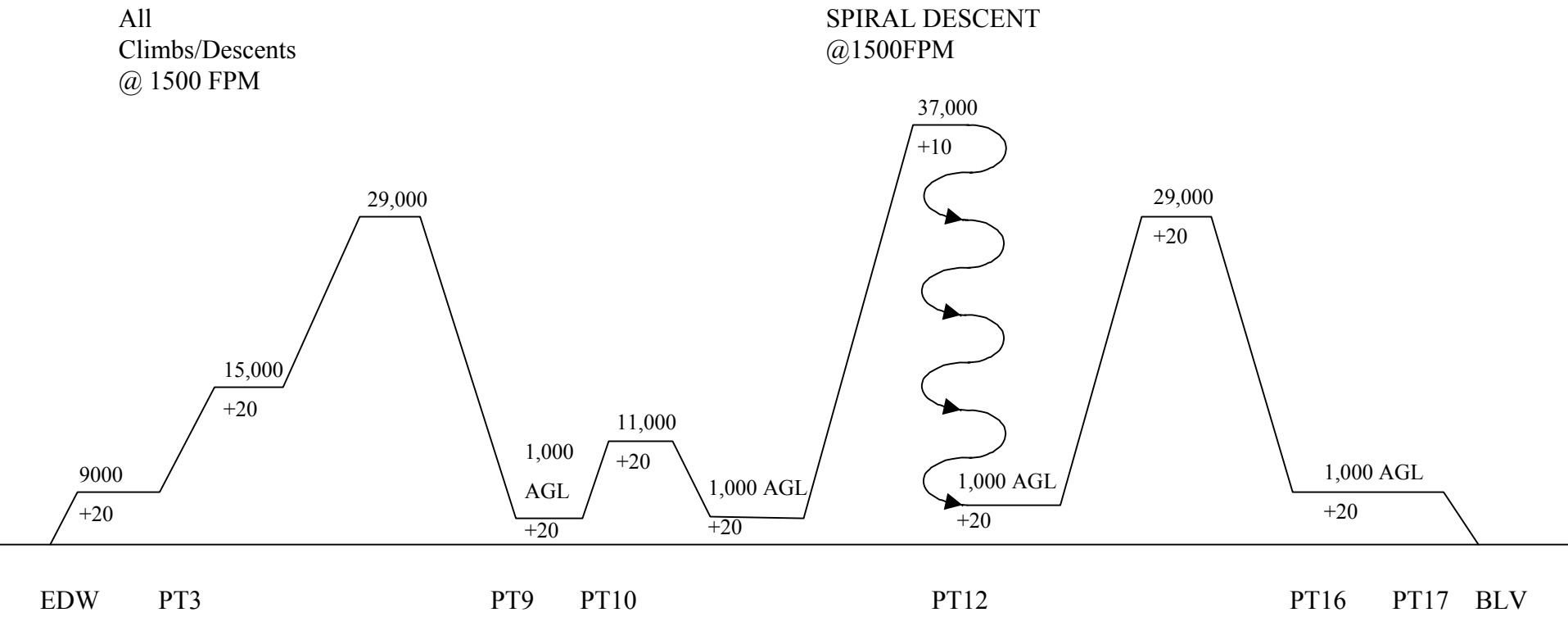
INTEX JULY 6


All
Climbs/Descents
@ 1500 FPM
SPIRAL DESCENT
@1500FPM
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+20
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+20
29,000
1,000
AGL
+20
11,000
+20
1,000 AGL
+20
37,000
+10
1,000 AGL
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29,000
+20
1,000 AGL
+20
EDW
PT3
PT9
PT10
PT12
PT16
PT17
BLV

TYPE ACFT	CALL SIGN	DATE	FROM	TO	PLND TO	ACT TO	PILOT	COPILOT
DC-8	NASA817		EDWARDS AFB N 34 54.3 W117 53.0	SCOTT AFB MID N 38 32.7 W089 50.1	00:00			

TOT DIST	TOT TIME	FUEL REQ	NAVIGATOR	ENGINEER
2577.6	07+39	78928		

TP DTD#	Fix/Point Description	FREQ	Latitude Longitude	Alt Wind	TAS GS	TC MC	LEG DIST DIST REM	LEG TIME TIME REM	ETA	RETA	ATA	REMARKS
1	KEDW/A EDWARDS AFB		N 34 54.3 W117 53.0	2302M		058 044	5.0 2573	00+05 07+34	00:00			
2	DAG/R DAGGETT	079X 113.20	N 34 57.7 W116 34.7	15000M	360 360	090 076	60.2 2512	00+11 07+23	00:16			
3	PGS/R PEACH SPRINGS	057X 112.00	N 35 37.5 W113 32.7	15000M	360 360	075 062	154.2 2358	00+26 06+58	00:42			
4	TBC/R TUBA CITY	082X 113.50	N 36 07.3 W111 16.2	15000M	360 360	075 063	114.8 2243	00+19 06+38	01:01			
5	CIM/R CIMARRON	111X 116.40	N 36 29.5 W104 52.3	15000M	360 360	086 075	311.0 1932	00+52 05+47	01:53			
6	TBE/R TOBE	049X 111.20	N 37 15.5 W103 36.0	15000M	360 360	053 044	76.6 1856	00+13 05+34	02:05			
7	HUT/E HUTCHINSON	115X 116.80	N 37 59.8 W097 56.0	15000M	360 360	081 073	273.6 1582	00+46 04+48	02:51			
8	TOP/R TOPEKA	125X 117.80	N 39 08.2 W095 32.9	15000M	360 360	059 054	131.4 1451	00+22 04+26	03:13			
9	BQS/E BRAYMER	049X 111.20	N 39 37.8 W093 52.5	15000M	360 360	069 066	83.3 1368	00+14 04+12	03:27			
10	VLA/R VANDALIA	090X 114.30	N 39 05.6 W089 09.7	15000M	360 360	098 098	221.6 1146	00+37 03+36	04:04			
11	PMM/E PULLMAN	058X 112.10	N 42 27.9 W086 06.3	15000M	360 360	035 037	245.5 900	00+41 02+55	04:45			
12	PLN/R PELLSTON	055X 111.80	N 45 37.8 W084 39.8	15000M	360 360	018 024	199.9 701	00+33 02+21	05:18			

TP DTD#	Fix/Point Description	FREQ	Latitude Longitude	Alt Wind	TAS GS	TC MC	LEG DIST DIST REM	LEG TIME TIME REM	ETA	RETA	ATA	REMARKS
	.delay	055X	N 45 37.8	15000M	360	018	0.0	00+25	05:43			
		111.80	W084 39.8		360	025	701	01+56				
13	LAN/R	045X	N 42 43.0	15000M	360	180	174.8	00+29	06:12			
	LANSING	110.80	W084 41.9		360	187	526	01+27				
14	RID/R	043X	N 39 45.3	15000M	360	182	177.8	00+30	06:42			
	RICHMOND	110.60	W084 50.3		360	187	348	+58				
15	FFT/V		N 38 10.9	15000M	360	182	94.3	00+16	06:57			
	FRANKFORT	109.40	W084 54.5		360	187	254	+42				
16	EWO/E	045X	N 37 37.9	15000M	360	228	49.2	00+08	07:06			
	NEW HOPE	110.80	W085 40.6		360	232	204	+34				
17	ENL/R	097X	N 38 25.2	15000M	360	286	171.7	00+29	07:34			
	CENTRALIA	115.00	W089 09.5		360	288	33	+05				
18	KBLV/A		N 38 32.7	459M		283	32.7	00+05	07:39			
	SCOTT AFB MID		W089 50.1			284	0	+00				

Plan for flight #4:
Dryden-MidAmerica transect
last updated 7/5/04 01Z

Objectives:
(1) California plume transported to east
(2) AZ-CO fire plumes
(3) AIRS validation (not feasible)
(4) Frontal crossings over midwest
(5) Convective outflow over Great Plains

7h flight